

THURSDAY, MARCH 18, 1875

SCIENTIFIC SURVEYS

THE almost universal idea in this country of what constitutes a Scientific Survey goes no further, we believe, than the departments of Topography and Geology, and, as we are a seafaring people, the Hydrography of our coasts. We daresay many of our readers will be surprised to hear that some whose opinions in matters of this kind ought to have great weight, deem any survey totally inadequate which does not, to a greater or less extent, include nearly every department of science. What are the prevalent notions on the subject on the other side of the water, may be learned from a Report just issued on a proposed New Survey of the small State of Massachusetts.

Last year the American Academy of Art and Sciences presented a memorial to the General Court of the State of Massachusetts, urging the necessity for a new Scientific Survey of the Commonwealth. It is forty years since there was a survey of the State; that was the first public survey in the United States, and included not only topography and geology, but zoology, botany, and agriculture as well. The biological surveys were so well done that some of the reports are even yet regarded as standard works, but the advances in all departments during the past forty years have been so great, that practically a new survey is required.

The suggestion of the new survey came appropriately from the principal scientific body of the State, and it is gratifying to see that the Legislature have such a respect for its opinion as at once to take action upon the suggestion. The memorial of the Academy was referred to the Board of Education, a committee of which took the wise course of calling to their council the most eminent men of science in the State, who could aid them with their advice. The names of most of those who were called in to give the results of their study and experience are known to science all the world over; they are Professors B. Peirce, N. S. Shaler, and E. N. Horsford; President Clark, Dr. T. Sterry Hunt, Dr. Asa Gray, Dr. A. S. Packard, Mr. G. B. Emerson (who reported on the trees and shrubs in the former survey), Mr. Alex. Agassiz, Hon. Moses Kimball, Mr. C. F. Adams, Mr. S. H. Scudder, Mr. A. G. Boyden, and Mr. H. F. Walling.

The Report which has come to hand gives an account of the meeting between these eminent representatives of science, pure and applied, and the committee of the Board of Education. Each one freely expressed his opinion of the desirableness of the proposed survey, showed how it should be conducted so far as his own department was concerned, and pointed out the advantages which would certainly follow from a thorough survey. As might be expected, they are unanimously in favour of the proposed undertaking; and the immense advantages which were shown would accrue from it if carried out thoroughly in all departments, leave the State no alternative but to organise it as early as convenient.

A special committee from among the men of science named above—Messrs. Peirce, Sterry Hunt, Shaler, and Scudder—in their Report to the Education Committee

recommend a scale of 1 : 25000, or $2\frac{1}{2}$ inches to the mile, as the scale which ought to be adopted for the survey; but this they do solely on the score of expense, admitting the superiority of the 6-inch scale. Prof. N. S. Shaler, in an impressive article in the March number of the *Atlantic Monthly*, strongly advocates the latter scale; for although the immediate cost would be at least double that of the smaller scale, still in the end it would be more economical; as, although the smaller scale would serve many useful purposes in the meantime, he declares it would be found that the survey would have to be repeated on the larger scale. We think the State of Massachusetts would be wise to profit by Mr. Shaler's hint, and accomplish the survey once thoroughly and completely on the larger scale, so that it would never require to be repeated. Indeed, the United States have had several lessons on this point; a considerable number of the States have been surveyed, but the surveys have all been more or less failures; "there is not a single survey in this country," Prof. Shaler states, "which does not need at the moment to be done over again."

The practical advantages of topographical and geological surveys are so evident that it is unnecessary to point them out; no one, we presume, will deny that it is the interest and duty of every civilised country to obtain a complete and trustworthy knowledge of the extent, configuration, and composition of its surface. The important practical advantages which may result from a thorough geological survey have been well illustrated by a recent undertaking in America—the Hoosac Tunnel. It is Prof. Shaler's belief that "a due inspection of the surface of that ridge would have disclosed some of the difficulties encountered in the excavation of the tunnel, difficulties which would have been in a large measure avoided, had the engineers been forewarned. It does not seem too much to say that the cost of a complete survey, with a map on the scale of six inches to the mile, might have been saved by this easily gained knowledge."

But the State of Massachusetts has already had the wisdom to perceive that it is for the material advantage of a country that a knowledge of more than its topography and its geology should be easily accessible. To a thickly populated country, what can be of more moment than its hydrography, its water supply, which is also of so great importance in connection with manufactures? In the proposed survey of Massachusetts a thorough knowledge of its hydrography will probably be considered as an indispensable part of the work. It seems almost a truism to say that in a country devoted to agriculture, an exhaustive scientific examination of its soil would be a work of the greatest national advantage; such an examination has been to some extent made in Massachusetts, and the scientific men whose advice has been asked urge that it should be carried out over the whole of the State.

The practical advantages to be derived from a knowledge of the botany and zoology of a country, especially a country where agriculture is one of the staple industries, seem almost equally apparent. If our farmers were well acquainted with all the plants and insects and birds which annually destroy so large a quantity of the cultivated produce of the soil, and at the same time knew how to meet their ravages, the saving to the nation would be enormous. Dr. A. S. Packard estimates that in Mas-

sachusetts alone they lose every year, from insects and parasitic plants, 500,000,000 dollars; and that in one year alone they lost by the army-worm 250,000 dollars' worth of hay-crops. No wonder he says, "Certainly it will be a good thing to have a body of observers at work systematically, year after year, collecting information, which may be spread before the farmers of the State and others interested." In this connection the words of Mr. A. G. Boyden are worth quoting:—

"The relation of the animal to the vegetable kingdom is a most intimate one. In the cultivation of orchards, garden vegetables, and things of that sort, upon which we as a people depend a great deal, we have to contend continually with insects; if we could learn, therefore, the facts about the insects that are found in this State; if we knew how they were generated, how they grow, and what they feed on, we might do a great deal towards saving a large part of the crops that are now destroyed by them. For instance, the canker-worm comes periodically, and very few people know much about the habits of this insect. Very little is known about insects by people generally. They do not even know them by name. They do not recognise an insect in the three stages of its life. Every gardener, every orchardist, every person cultivating herbs, trees, or shrubs, needs this information. As has been said this morning, we have not the books to which we can go for help in gaining this information. . . . Mr. Emerson has given us an excellent book on the trees of the State, which is a very great aid, but in respect to the other matters of which I have spoken, we have very few such helps as are needed. It would seem, therefore, that a survey of this kind, in which scientific men were employed, who could, as they went over the different localities of the State, collect, incidentally, and without adding very much to the expense, the facts relating to these subjects, would be of great value."

The body of evidence contained in the Report before us seems to us to show clearly, what indeed is almost self-evident, that one of the first duties of a nation, from the lowest point of view of self-interest, is to obtain a complete scientific knowledge of its home and all that it contains; only thus can it be able to make the most of its natural resources.

While the great practical advantages of the survey were insisted upon, the gains to science and to education which would accrue from it were also brought prominently forward. Some important problems in science, it was shown, might be solved by a thorough geological and biological survey of Massachusetts; one of the most important of these is in connection with Cape Cod.

"Here, in Massachusetts," Prof. Shaler says, "you have certain peculiar questions connected with the distribution of animal life to the north and south of Cape Cod, which offers one of the most remarkable illustrations of the variations in the distribution of animal life that is afforded anywhere in the world. The constant changes as years go by, the influence of temperature on the distribution of animals, these are questions which can be investigated there. There is no question that Cape Cod is one of the great problems of Massachusetts, and it is a problem on which a large number of investigations should be hung. Prof. Peirce, who has carefully traced and grouped the facts connected with that part of the coast, will agree with me in saying that Cape Cod is the key-point; that geologically it is the most important point in Massachusetts, with regard to the agencies that have been at work in the creation of the soil, especially with reference to the glacial period, &c."

With regard to education, it was shown that in several

ways this exhaustive survey would be of great value. It was proposed by some that the scientific students in the several colleges might with advantage to themselves be occasionally employed on the work, while they might be of some assistance to the survey-parties; this plan, if judiciously carried out, might indeed be of great service both to the students and to the work of the survey. Prof. Shaler pointed out that what he thinks the principal defect of the British Survey does not concern its work, but its effect upon British science. "It has not taken pains," he said—and we cannot take upon ourselves to judge of the justice of his statement—"to connect itself enough with the work of education in Great Britain; and the result is, as is admitted by some of the oldest geologists there, that there are few young geologists coming up in England at this time." This, if true, is certainly a great lesson for Massachusetts, as Prof. Shaler says; we hope, however, he has overstated the case, or at least that the supply of geologists in this country is not dependent on the Geological Survey. It was shown that in other ways a complete survey in all departments would be of the highest advantage in carrying on the practical education of the young in schools of all classes; and that from want of the results of such a survey, education was seriously hampered.

It will thus be seen that if in the course of years—for it is proposed to do the work leisurely and allow eminent scientific men to share in it as they can find opportunity—the people of Massachusetts do not have one of the most accurate and most complete surveys in the world, it will simply be because they are blind to their own real interests, which have so forcibly been brought before them by some of the most eminent of their scientific men, in whom the State is so rich. But as "the commonwealth of Massachusetts has not been wont long to weigh great advantages against small expenditures, so we may safely anticipate," with Prof. Shaler, "her speedy action."

Need we point any moral for ourselves from the liberal and comprehensive ideas which the comparatively small (its extent, 7,800 miles, is only about that of Wales) and young State of Massachusetts has of what a survey of her territory includes? We have our topographical and our geological surveys, both doing excellent work, and both already productive of large practical and scientific results. But if we want to make the most of our small and over-crowded country; if we want, as we certainly should if we have our own welfare at heart, to have a complete knowledge of our country's resources, why should we stop short at topography and geology? Forty years ago Massachusetts showed itself to be far wiser than Britain is even now. Even then the little Transatlantic State saw it to be to its best advantage to know all about its soil and its natural products; we do not know that the question has ever been mooted in this country. A knowledge of what is being done on the other side of the water may give us a perception of our true interests and our duty to ourselves and the world. To apply the words of Prof. Shaler: "Look at it as we may, measuring its immediate gains to our mines, our fields, our water-mills, to our cities in their water supply and sewage, to our railways and common roads, to the interests of each owner of an acre that is to be improved; or considering

the remoter yet not less real economy which is found in increased knowledge of the Nature about us, and in the advancement of education, the reasons for Survey this are very strong."

THE COUNTESS OF CHINCHON

A Memoir of the Lady Ana de Osorio, Countess of Chinchon and Vice-Queen of Peru; with a plea for the correct spelling of the Chinchona genus. By C. R. Markham, C.B., F.R.S. (London: Trübner and Co.)

THIS work is an attractive addition to the early history of quinine and the other alkaloids derived from the same source. The general subject is full of interest to numerous classes of the community, and the importation of plants into our Indian possessions has been the subject of much attention on the part of our Government. Indeed, it was the result of the author's exertions that living specimens were obtained in this country, and by this means that India was supplied; it is therefore natural that he should take a parental interest in this matter.

The knowledge of the efficacy of these drugs was brought to Europe in the year 1640 by the Countess of Chinchon on her return to Spain with her husband at the expiration of his term of office as Viceroy of Peru. This lady during her residence there was attacked by tertian fever, and after being reduced to the point of death, was, under romantic circumstances related by the author, cured by the use of Peruvian bark. On the return of the count and countess to the castle of Chinchon, it is gratifying to read that the countess, who had brought with her a supply of the precious bark which had effected such a wonderful cure upon herself, "administered Peruvian bark to the sufferers from tertian agues on her lord's estates in the fertile but unhealthy *vegas* of the Tagus, the Jarama, and the Tajuña. She thus spread blessings around her, and her good deeds are even now remembered by the people of Chinchon and Colmenar in local traditions" (p. 45).

Though from time to time during the succeeding hundred years powders of the Peruvian bark were imported into Europe, it seems that no scientific account of the tree was published until 1740, in which year De la Coudamine published a description and figure in the Memoirs of the Academy of Paris for 1738, under the generic name of *Quinquina*. This communication contained also an account of the history of the drug, wherein the name of the Countess of Chinchon was duly mentioned and properly spelt, and on the information obtained from it and quoted in acknowledgment, Linnæus, in the second edition of his "Genera Plantarum," published at Leyden in the year 1742, founded his genus *Cinchona* in honour of the Countess of Chinchon.

The author commences his book by tracing the pedigrees, accompanied by coloured illustrations of the armorial bearings, of the families of Ana, Countess of Chinchon, and of the Count of Chinchon; nor does he omit to describe and illustrate the town, neighbourhood, and castle of Chinchon. The town contains some 6,000 souls, and its distance south-east from Madrid is given as twenty-four miles.

But it is reserved to the end of the book to treat of a

matter which evidently lies deeply seated in the author's affections; unless for its sake the book would probably never have been written. This is a vigorous argument, called in the title a plea, for what he considers to be the correct spelling of the generic name.

The author's object is to prove that the name *Cinchona* should be replaced by *Chinchona*, and he argues that the latter form is etymologically right, that Linnæus was misinformed as to the true spelling of the countess's title, that it is supported by the majority of authorities who have studied the genus in its native *habitat*, and is now the form in common use where the plant is cultivated, as well as in official correspondence, and that it is consequently the most convenient form. He further states that the former spelling has never been generally adopted.

In the matter of etymology the author is certainly right, but neither botanists nor the public are simply led by this rule when more important considerations require a different course; botanists have greater regard to priority and the public to general convenience, and both in respect of priority and convenience *Cinchona* is the more correct word.

It has been already explained that Linnæus was not misinformed as to the spelling of Chinchon; and it is therefore probable that he considered euphony in forming the name, in accordance with his aphorisms: *Terminatio et Sonus nominum genericorum, quantum fieri possit, facilitanda sunt. Nomina generica sesquipedalia, enunciati difficilia vel nauseabunda fugienda sunt.* Thus, in honour of Barrelierus, Linnæus named Barleria, and in many other cases he sacrificed strict etymology to elegance and convenience.

Mr. Hanbury, in the *Athenæum* for January 30, has shown that, in the course of a long correspondence with Linnæus, Mutis, though in his earlier letters he spelt the name *Chinchona*, yet in his later letters he followed the spelling of Linnæus, and wrote *Cinchona*; also, that in 1758, J. Ch. Petersen read at Upsala an academical dissertation, "*De Cortice Peruviano*," Linnæus presiding, and in this paper he always spelt the word *Chinchona*; this is, however, not a botanical essay.

Linnæus, in all his other works and editions, always retains his original spelling. The author erroneously states that Linnæus altered the spelling in his different editions, and draws the inference that Linnæus was willing to modify his original spelling and desired to spell the word correctly. In the sixth edition of the "Genera Plantarum," published at Stockholm in 1764, on p. 91 the word is accidentally spelt *Cinhona*, but this was clearly a typographical error; for in the synopsis of the genera of Pentandria, on p. 69, it is spelt *Cinchona*, and so again in the index to the volume; and if further proof is wanted, the error on p. 91 was given in the errata and corrected. In the edition of 1767, printed at Vienna, which is without the authority of Linnæus, and is, in fact, only a reprint of the sixth edition, the same spellings occur in each place, except that we find in the errata, *Cinbona* (instead of *Cinhona*) corrected into *Cinchona*.

So universal was the authority of the Linnæan spelling, that no botanical treatise published and adopted a different one until the year 1862. The name *Chinchona* does not occur in Steudel's "Nomenclator Botanicus," second edition, published in 1840-41.